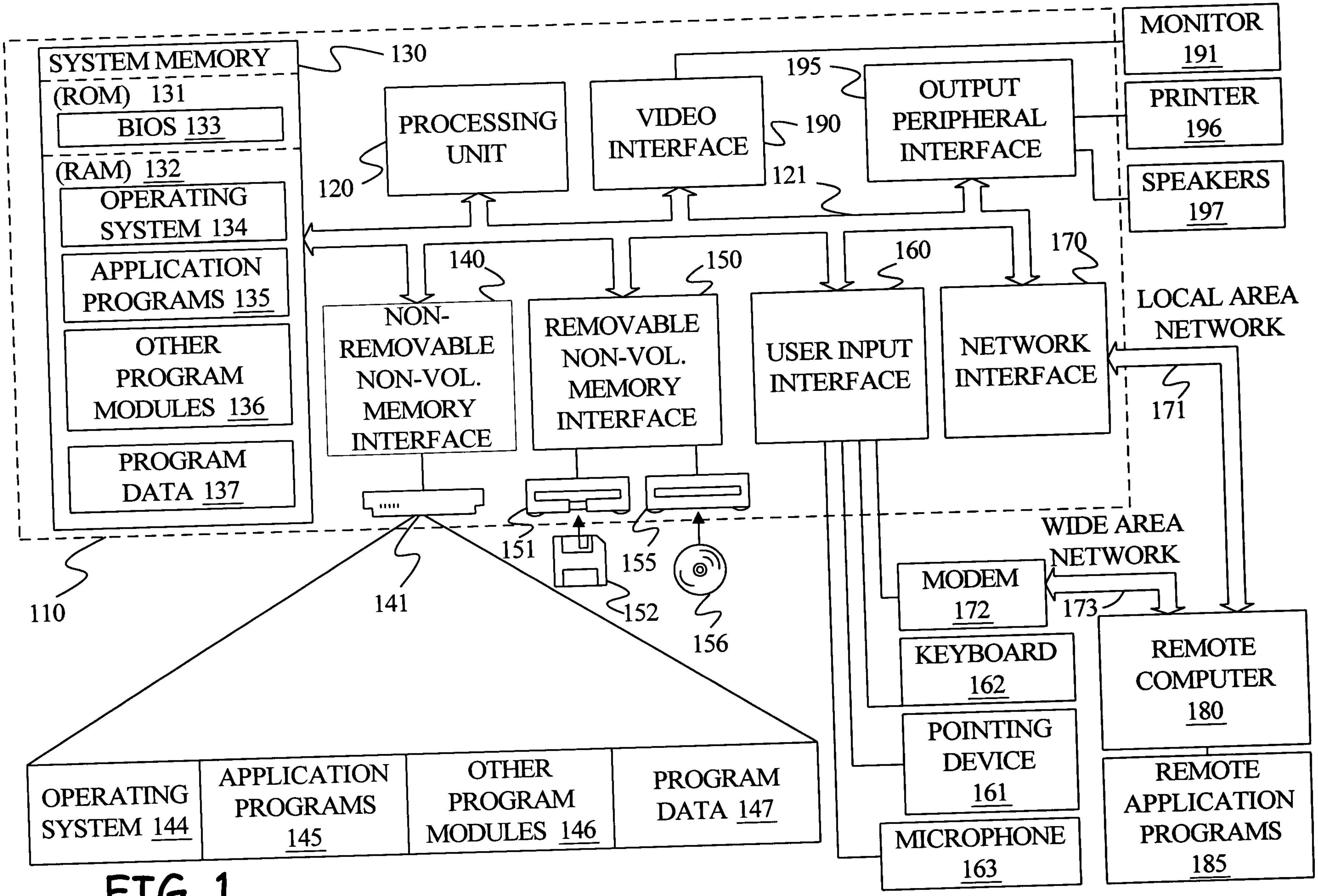

SYSTEM MEMORY
130
(ROM) 131
BIOS 133
(RAM) 132
OPERATING SYSTEM 134
APPLICATION PROGRAMS 135
OTHER PROGRAM MODULES 136
PROGRAM DATA 137
120
PROCESSING UNIT
VIDEO INTERFACE
190
121
195
OUTPUT PERIPHERAL INTERFACE
MONITOR 191
PRINTER 196
SPEAKERS 197
140
NON-REMOVABLE NON-VOL. MEMORY INTERFACE
150
REMOVABLE NON-VOL. MEMORY INTERFACE
160
USER INPUT INTERFACE
170
NETWORK INTERFACE
LOCAL AREA NETWORK
171
WIDE AREA NETWORK
MODEM 172
173
REMOTE COMPUTER 180
REMOTE APPLICATION PROGRAMS 185
KEYBOARD 162
POINTING DEVICE 161
MICROPHONE 163
110
141
151
152
155
156
OPERATING SYSTEM 144
APPLICATION PROGRAMS 145
OTHER PROGRAM MODULES 146
PROGRAM DATA 147

FIG. 1

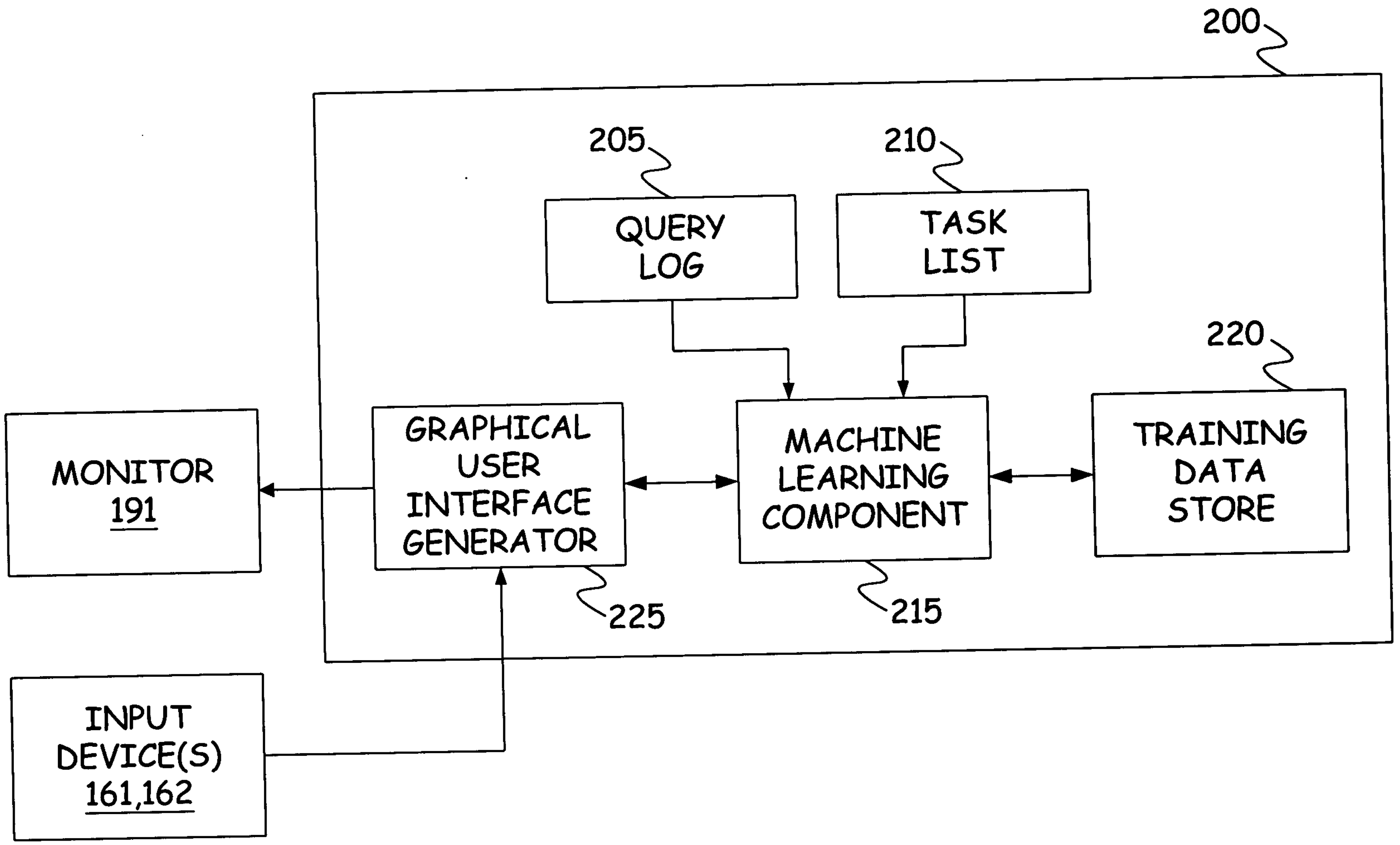
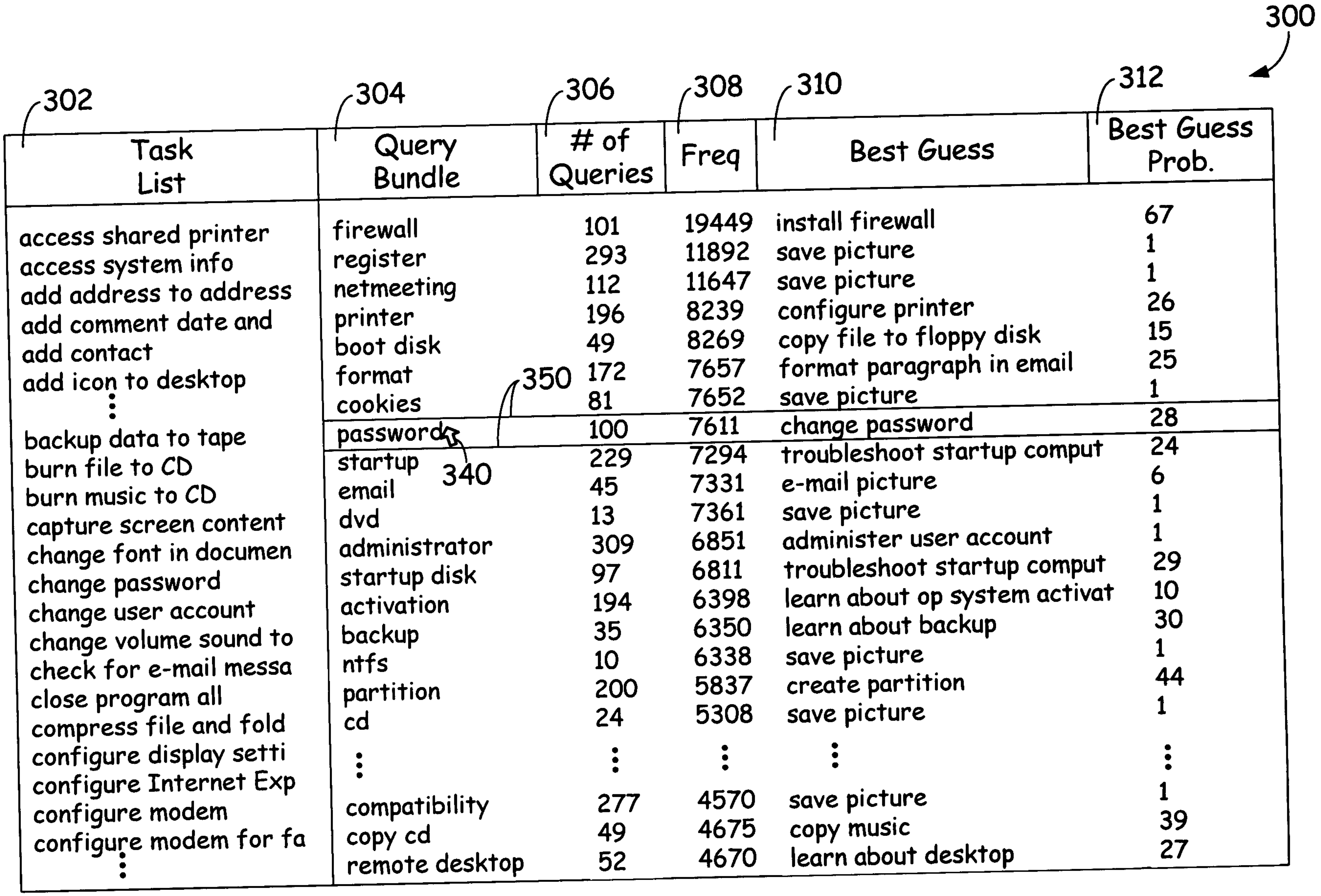

200
205
QUERY LOG
210
TASK LIST
220
MONITOR 191
GRAPHICAL USER INTERFACE GENERATOR
MACHINE LEARNING COMPONENT
TRAINING DATA STORE
225
215
INPUT DEVICE(S) 161,162

FIG. 2

300

| 302 | 304 | 306 | 308 | 310 | 312 |
|---|---|---|---|---|---|
| Task List | Query Bundle | # of Queries | Freq | Best Guess | Best Guess Prob. |
| access shared printer | firewall | 101 | 19449 | install firewall | 67 |
| access system info | register | 293 | 11892 | save picture | 1 |
| add address to address | netmeeting | 112 | 11647 | save picture | 1 |
| add comment date and | printer | 196 | 8239 | configure printer | 26 |
| add contact | boot disk | 49 | 8269 | copy file to floppy disk | 15 |
| add icon to desktop | format | 172 | 7657 | format paragraph in email | 25 |
| ⋮ | cookies | 81 | 7652 | save picture | 1 |
| backup data to tape | password | 100 | 7611 | change password | 28 |
| burn file to CD | startup | 229 | 7294 | troubleshoot startup comput | 24 |
| burn music to CD | email | 45 | 7331 | e-mail picture | 6 |
| capture screen content | dvd | 13 | 7361 | save picture | 1 |
| change font in documen | administrator | 309 | 6851 | administer user account | 1 |
| change password | startup disk | 97 | 6811 | troubleshoot startup comput | 29 |
| change user account | activation | 194 | 6398 | learn about op system activat | 10 |
| change volume sound to | backup | 35 | 6350 | learn about backup | 30 |
| check for e-mail messa | ntfs | 10 | 6338 | save picture | 1 |
| close program all | partition | 200 | 5837 | create partition | 44 |
| compress file and fold | cd | 24 | 5308 | save picture | 1 |
| configure display setti |  |  |  |  |  |
| configure Internet Exp | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| configure modem | compatibility | 277 | 4570 | save picture | 1 |
| configure modem for fa | copy cd | 49 | 4675 | copy music | 39 |
| ⋮ | remote desktop | 52 | 4670 | learn about desktop | 27 |

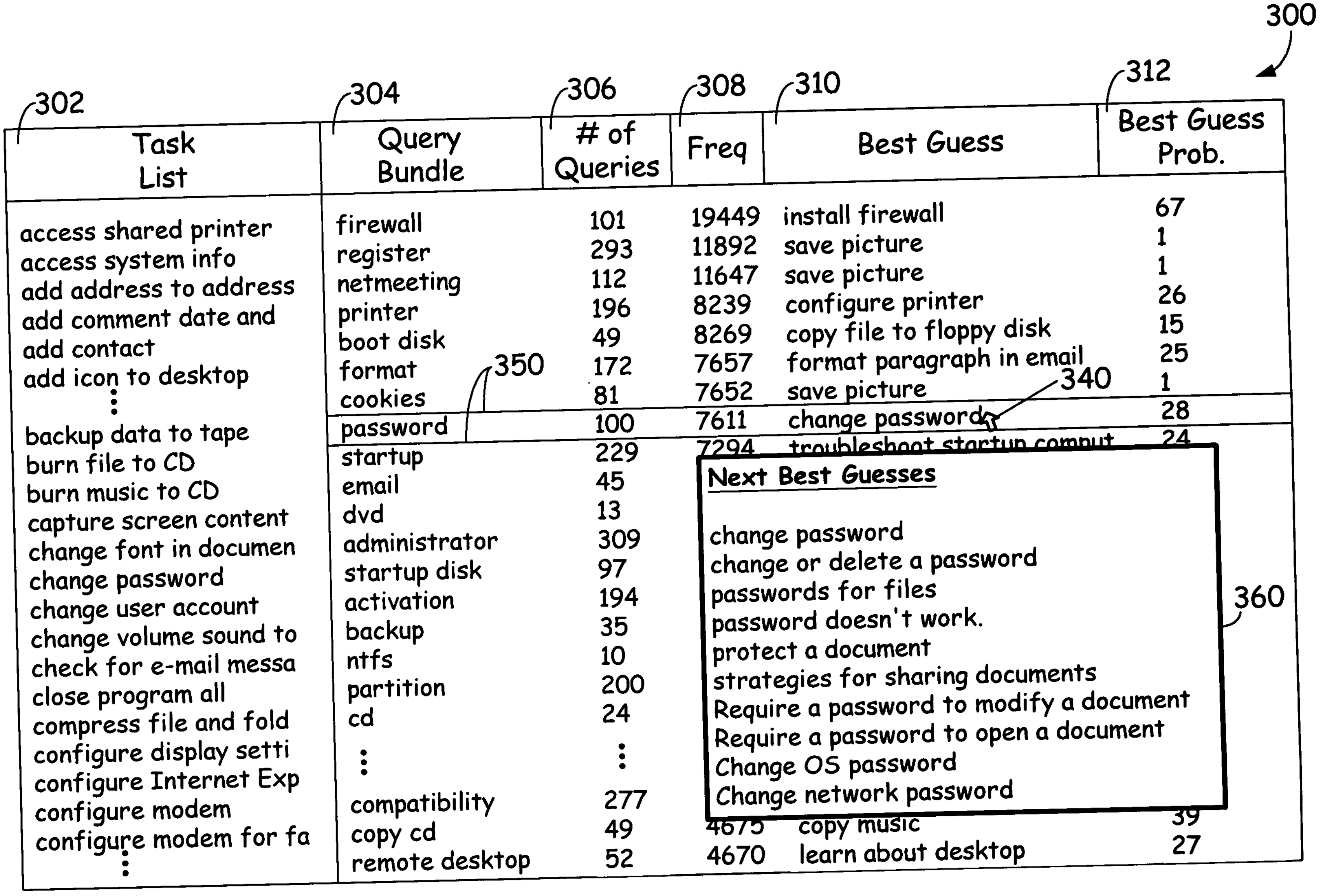
FIG. 3


300
302
304
306
308
310
312
340
350

| Task List |
|---|
| access shared printer |
| access system info |
| add address to address |
| add comment date and |
| add contact |
| add icon to desktop |
| ⋮ |
| backup data to tape |
| burn file to CD |
| burn music to CD |
| capture screen content |
| change font in documen |
| change password |
| change user account |
| change volume sound to |
| check for e-mail messa |
| close program all |
| compress file and fold |
| configure display setti |
| configure Internet Exp |
| configure modem |
| configure modem for fa |
| ⋮ |

| Query Bundle | # of Queries | Freq | Best Guess | Best Guess Prob. |
|---|---|---|---|---|
| firewall | 101 | 19449 | install firewall | 67 |
| register | 293 | 11892 | save picture | 1 |
| netmeeting | 112 | 11647 | save picture | 1 |
| printer | 196 | 8239 | configure printer | 26 |
| boot disk | 49 | 8269 | copy file to floppy disk | 15 |
| format | 172 | 7657 | format paragraph in email | 25 |
| cookies | 81 | 7652 | save picture | 1 |
| password | 100 | 7611 | change password | 28 |
| startup | 229 | 7294 | troubleshoot startup comput | 24 |
| email | 45 | 7331 | e-mail picture | 6 |
| dvd | 13 | 7361 | save picture | 1 |
| administrator | 309 | 6851 | administer user account | 1 |
| startup disk | 97 | 6811 | troubleshoot startup comput | 29 |
| activation | 194 | 6398 | learn about op system activat | 10 |
| backup | 35 | 6350 | learn about backup | 30 |
| ntfs | 10 | 6338 | save picture | 1 |
| partition | 200 | 5837 | create partition | 44 |
| cd | 24 | 5308 | save picture | 1 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| compatibility | 277 | 4570 | save picture | 1 |
| copy cd | 49 | 4675 | copy music | 39 |
| remote desktop | 52 | 4670 | learn about desktop | 27 |

FIG. 4

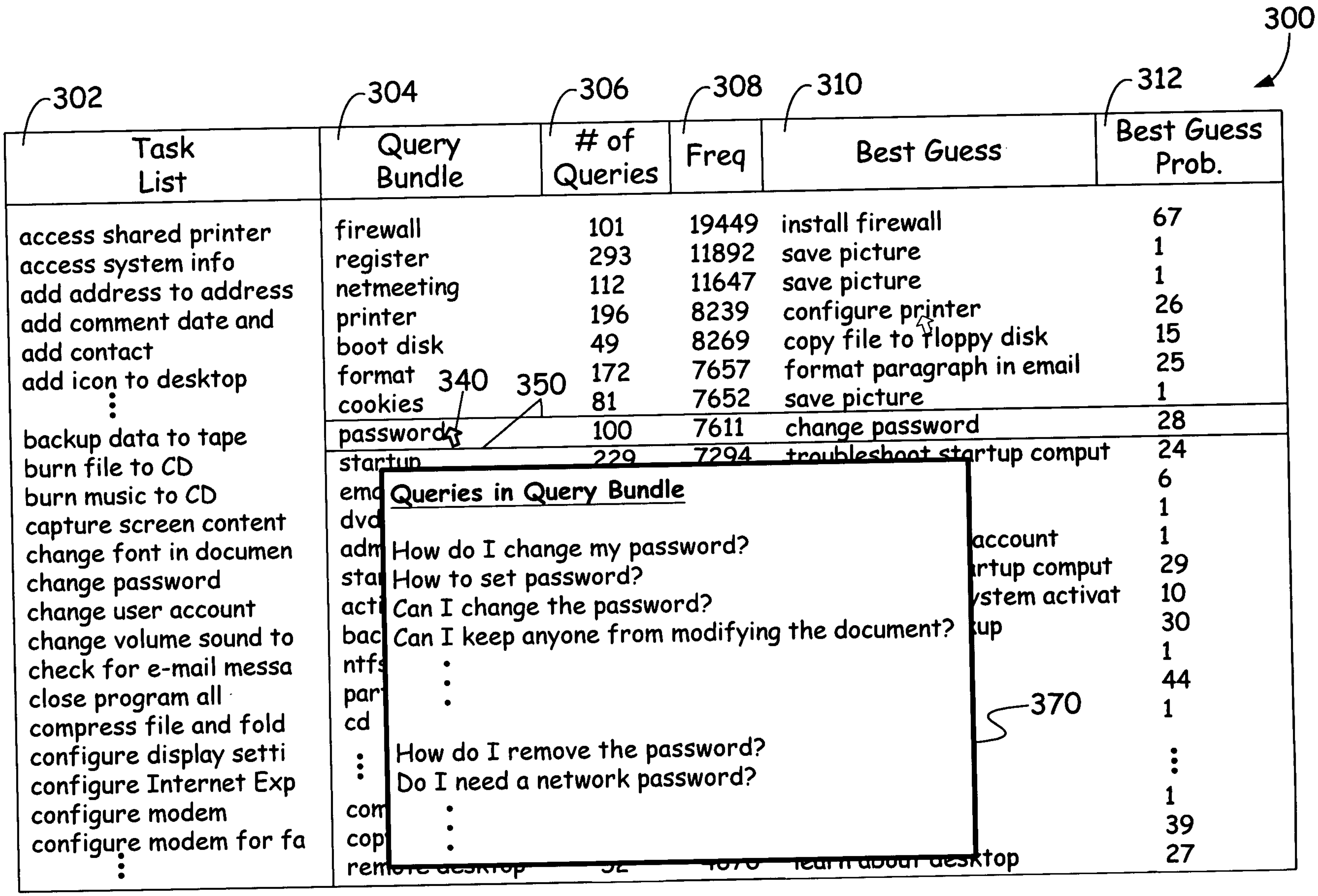


| Task List | Query Bundle | # of Queries | Freq | Best Guess | Best Guess Prob. |
|---|---|---|---|---|---|
| access shared printer | firewall | 101 | 19449 | install firewall | 67 |
| access system info | register | 293 | 11892 | save picture | 1 |
| add address to address | netmeeting | 112 | 11647 | save picture | 1 |
| add comment date and | printer | 196 | 8239 | configure printer | 26 |
| add contact | boot disk | 49 | 8269 | copy file to floppy disk | 15 |
| add icon to desktop | format | 172 | 7657 | format paragraph in email | 25 |
| ⋮ | cookies | 81 | 7652 | save picture | 1 |
| backup data to tape | password | 100 | 7611 | change password | 28 |
| burn file to CD | startup | 229 | 7294 | troubleshoot startup comput | 24 |
| burn music to CD | email | 45 | | | |
| capture screen content | dvd | 13 | | | |
| change font in documen | administrator | 309 | | | |
| change password | startup disk | 97 | | | |
| change user account | activation | 194 | | | |
| change volume sound to | backup | 35 | | | |
| check for e-mail messa | ntfs | 10 | | | |
| close program all | partition | 200 | | | |
| compress file and fold | cd | 24 | | | |
| configure display setti | ⋮ | ⋮ | | | |
| configure Internet Exp | | | | | |
| configure modem | compatibility | 277 | | | |
| configure modem for fa | copy cd | 49 | 4675 | copy music | 39 |
| ⋮ | remote desktop | 52 | 4670 | learn about desktop | 27 |

**Next Best Guesses**

change password
change or delete a password
passwords for files
password doesn't work.
protect a document
strategies for sharing documents
Require a password to modify a document
Require a password to open a document
Change OS password
Change network password

FIG. 5



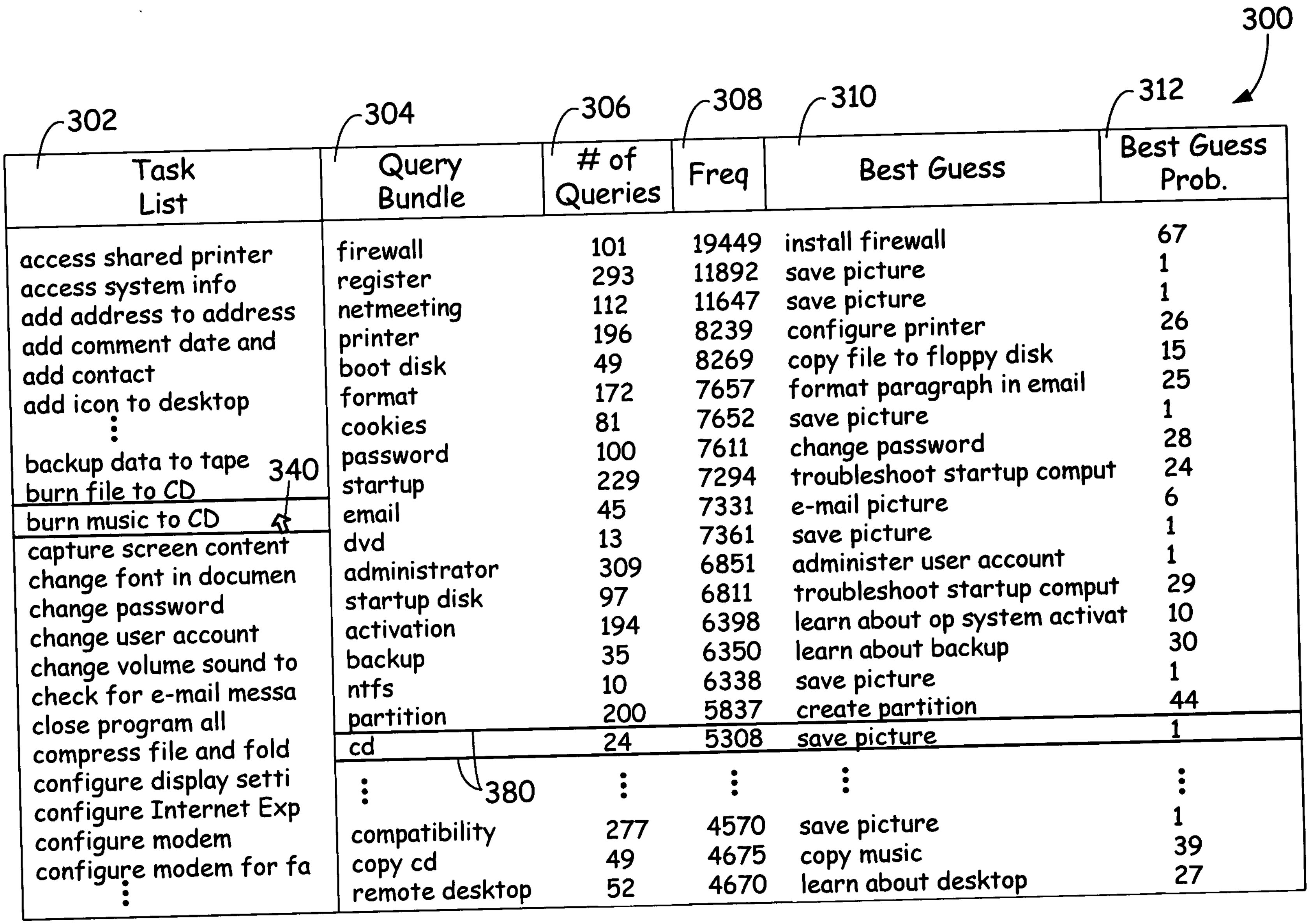
| Task List |
|---|
| access shared printer |
| access system info |
| add address to address |
| add comment date and |
| add contact |
| add icon to desktop |
| ⋮ |
| backup data to tape |
| burn file to CD |
| burn music to CD |
| capture screen content |
| change font in documen |
| change password |
| change user account |
| change volume sound to |
| check for e-mail messa |
| close program all |
| compress file and fold |
| configure display setti |
| configure Internet Exp |
| configure modem |
| configure modem for fa |
| ⋮ |

| Query Bundle | # of Queries | Freq | Best Guess | Best Guess Prob. |
|---|---|---|---|---|
| firewall | 101 | 19449 | install firewall | 67 |
| register | 293 | 11892 | save picture | 1 |
| netmeeting | 112 | 11647 | save picture | 1 |
| printer | 196 | 8239 | configure printer | 26 |
| boot disk | 49 | 8269 | copy file to floppy disk | 15 |
| format | 172 | 7657 | format paragraph in email | 25 |
| cookies | 81 | 7652 | save picture | 1 |
| password | 100 | 7611 | change password | 28 |
| startup | 229 | 7294 | troubleshoot startup comput | 24 |
| emc | | | | 6 |
| dvd | | | | 1 |
| adm | | | account | 1 |
| sta | | | rtup comput | 29 |
| acti | | | ystem activat | 10 |
| bac | | | kup | 30 |
| ntfs | | | | 1 |
| par | | | | 44 |
| cd | | | | 1 |
| ⋮ | | | | ⋮ |
| com | | | | 1 |
| cop | | | | 39 |
| remote desktop | 52 | [illegible] | learn about desktop | 27 |

**Queries in Query Bundle**

How do I change my password?
How to set password?
Can I change the password?
Can I keep anyone from modifying the document?
⋮
How do I remove the password?
Do I need a network password?
⋮

FIG. 6


300
302
304
306
308
310
312
340
380

**Task List**

- access shared printer
- access system info
- add address to address
- add comment date and
- add contact
- add icon to desktop
- ⋮
- backup data to tape
- burn file to CD
- burn music to CD
- capture screen content
- change font in documen
- change password
- change user account
- change volume sound to
- check for e-mail messa
- close program all
- compress file and fold
- configure display setti
- configure Internet Exp
- configure modem
- configure modem for fa
- ⋮

| Query Bundle | # of Queries | Freq | Best Guess | Best Guess Prob. |
|---|---|---|---|---|
| firewall | 101 | 19449 | install firewall | 67 |
| register | 293 | 11892 | save picture | 1 |
| netmeeting | 112 | 11647 | save picture | 1 |
| printer | 196 | 8239 | configure printer | 26 |
| boot disk | 49 | 8269 | copy file to floppy disk | 15 |
| format | 172 | 7657 | format paragraph in email | 25 |
| cookies | 81 | 7652 | save picture | 1 |
| password | 100 | 7611 | change password | 28 |
| startup | 229 | 7294 | troubleshoot startup comput | 24 |
| email | 45 | 7331 | e-mail picture | 6 |
| dvd | 13 | 7361 | save picture | 1 |
| administrator | 309 | 6851 | administer user account | 1 |
| startup disk | 97 | 6811 | troubleshoot startup comput | 29 |
| activation | 194 | 6398 | learn about op system activat | 10 |
| backup | 35 | 6350 | learn about backup | 30 |
| ntfs | 10 | 6338 | save picture | 1 |
| partition | 200 | 5837 | create partition | 44 |
| cd | 24 | 5308 | save picture | 1 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| compatibility | 277 | 4570 | save picture | 1 |
| copy cd | 49 | 4675 | copy music | 39 |
| remote desktop | 52 | 4670 | learn about desktop | 27 |

FIG. 7

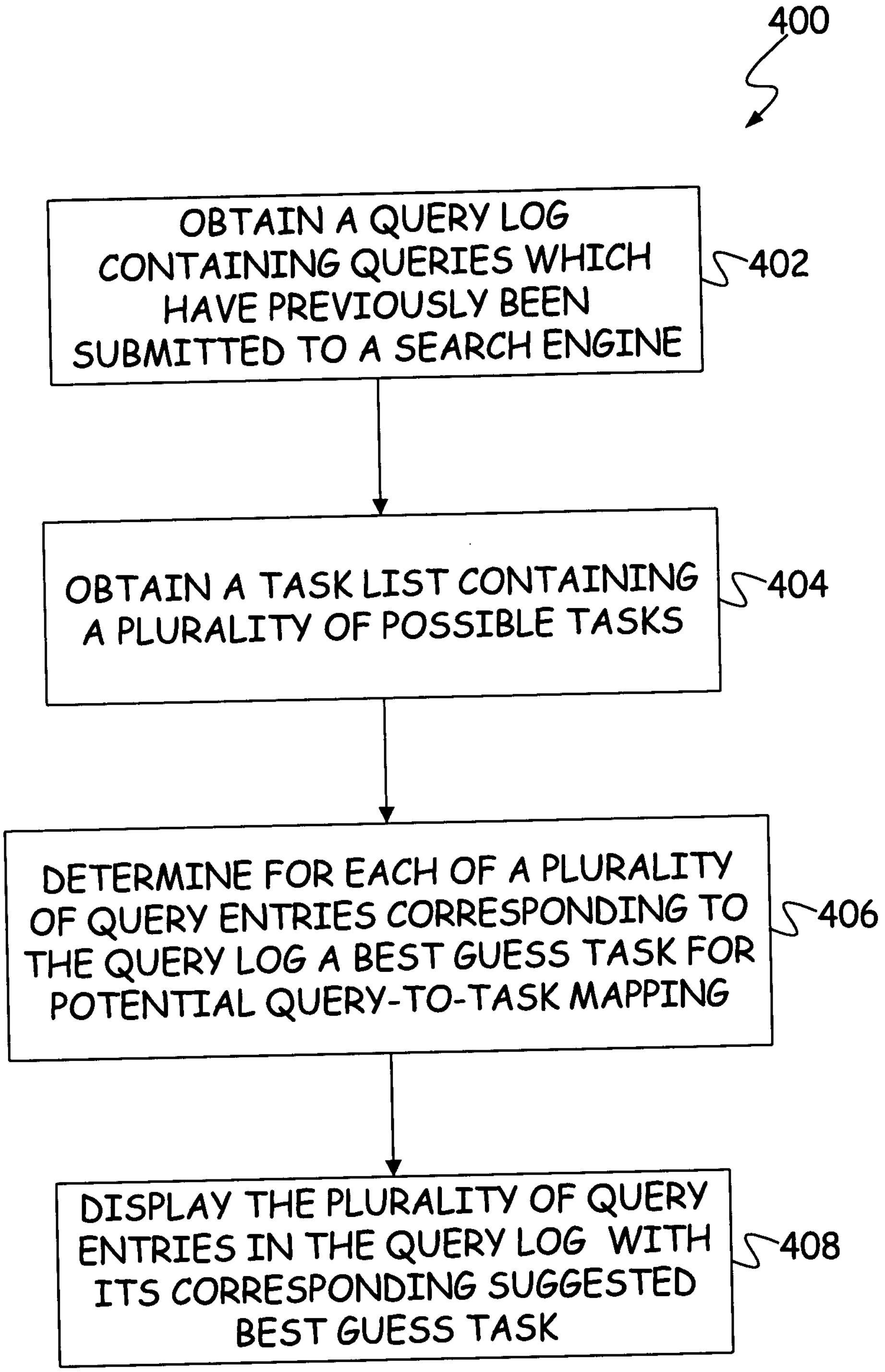

400
OBTAIN A QUERY LOG CONTAINING QUERIES WHICH HAVE PREVIOUSLY BEEN SUBMITTED TO A SEARCH ENGINE
402
OBTAIN A TASK LIST CONTAINING A PLURALITY OF POSSIBLE TASKS
404
DETERMINE FOR EACH OF A PLURALITY OF QUERY ENTRIES CORRESPONDING TO THE QUERY LOG A BEST GUESS TASK FOR POTENTIAL QUERY-TO-TASK MAPPING
406
DISPLAY THE PLURALITY OF QUERY ENTRIES IN THE QUERY LOG WITH ITS CORRESPONDING SUGGESTED BEST GUESS TASK
408

FIG. 8

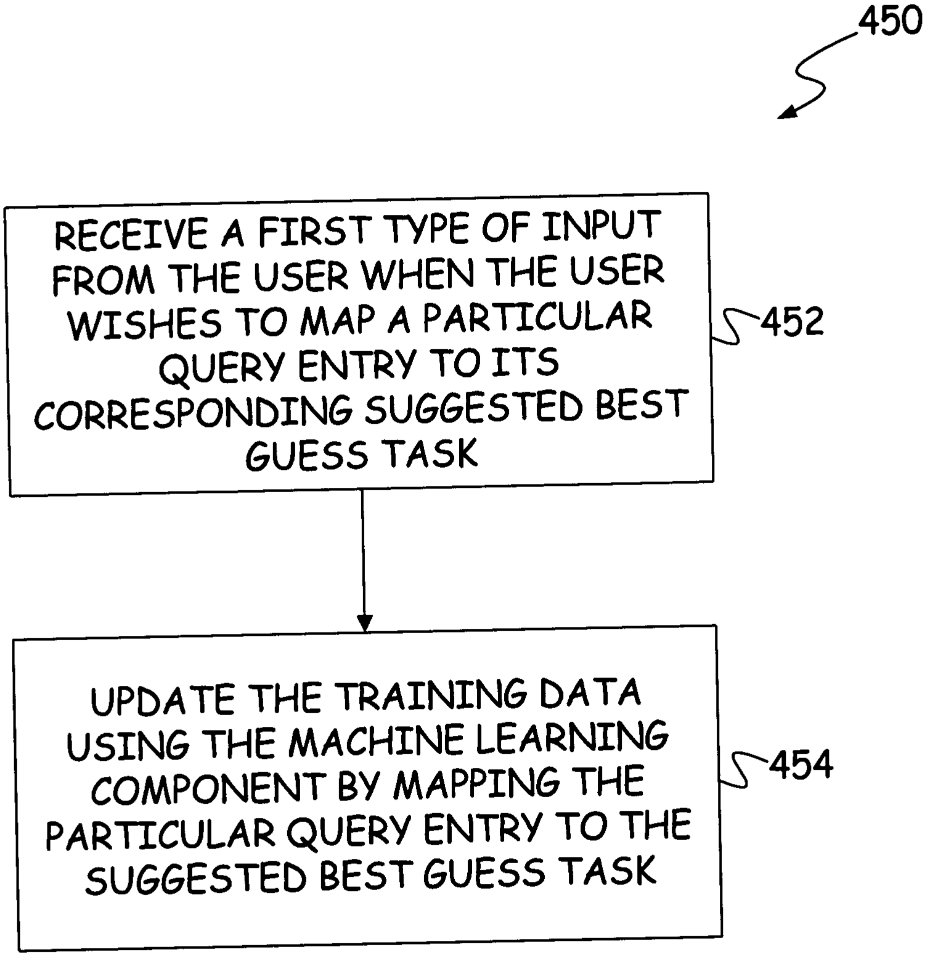

RECEIVE A FIRST TYPE OF INPUT FROM THE USER WHEN THE USER WISHES TO MAP A PARTICULAR QUERY ENTRY TO ITS CORRESPONDING SUGGESTED BEST GUESS TASK
UPDATE THE TRAINING DATA USING THE MACHINE LEARNING COMPONENT BY MAPPING THE PARTICULAR QUERY ENTRY TO THE SUGGESTED BEST GUESS TASK

FIG. 9

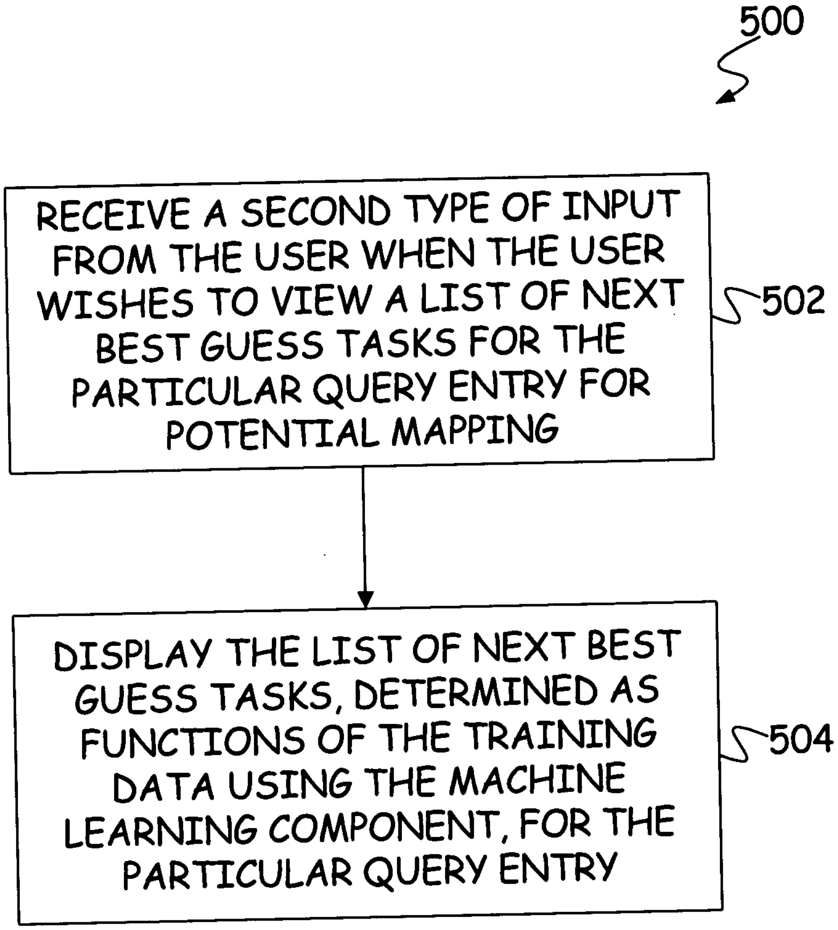

RECEIVE A SECOND TYPE OF INPUT FROM THE USER WHEN THE USER WISHES TO VIEW A LIST OF NEXT BEST GUESS TASKS FOR THE PARTICULAR QUERY ENTRY FOR POTENTIAL MAPPING
DISPLAY THE LIST OF NEXT BEST GUESS TASKS, DETERMINED AS FUNCTIONS OF THE TRAINING DATA USING THE MACHINE LEARNING COMPONENT, FOR THE PARTICULAR QUERY ENTRY

FIG. 10

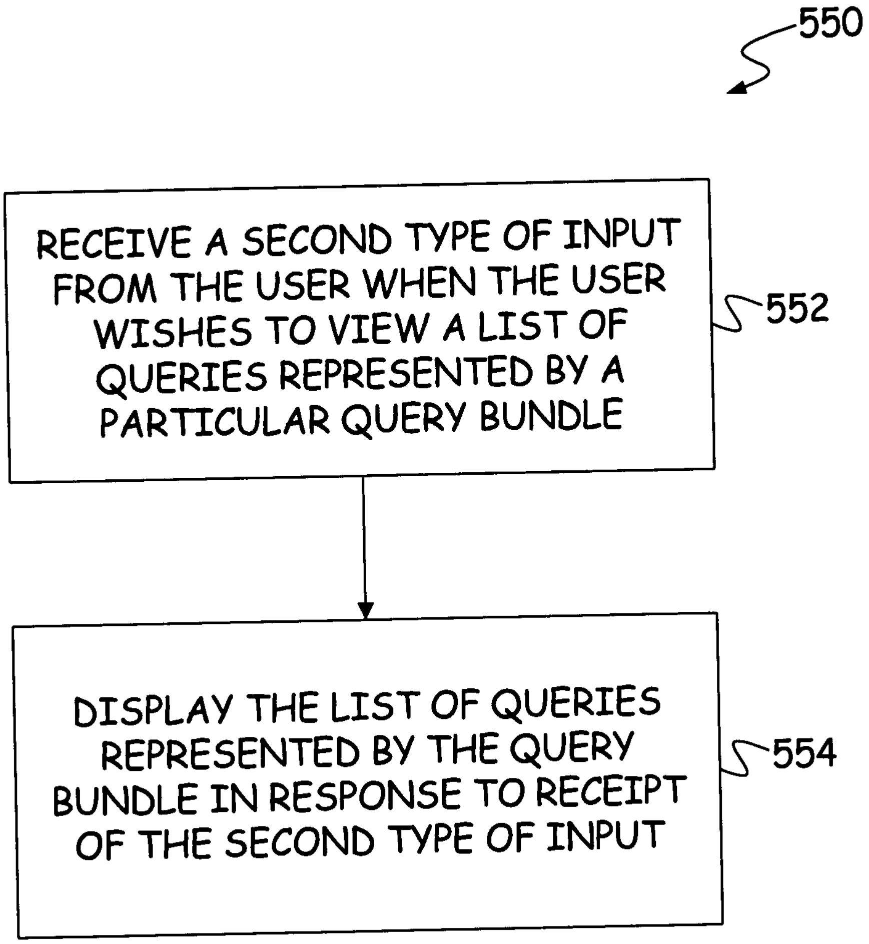

RECEIVE A SECOND TYPE OF INPUT FROM THE USER WHEN THE USER WISHES TO VIEW A LIST OF QUERIES REPRESENTED BY A PARTICULAR QUERY BUNDLE
DISPLAY THE LIST OF QUERIES REPRESENTED BY THE QUERY BUNDLE IN RESPONSE TO RECEIPT OF THE SECOND TYPE OF INPUT

FIG. 11

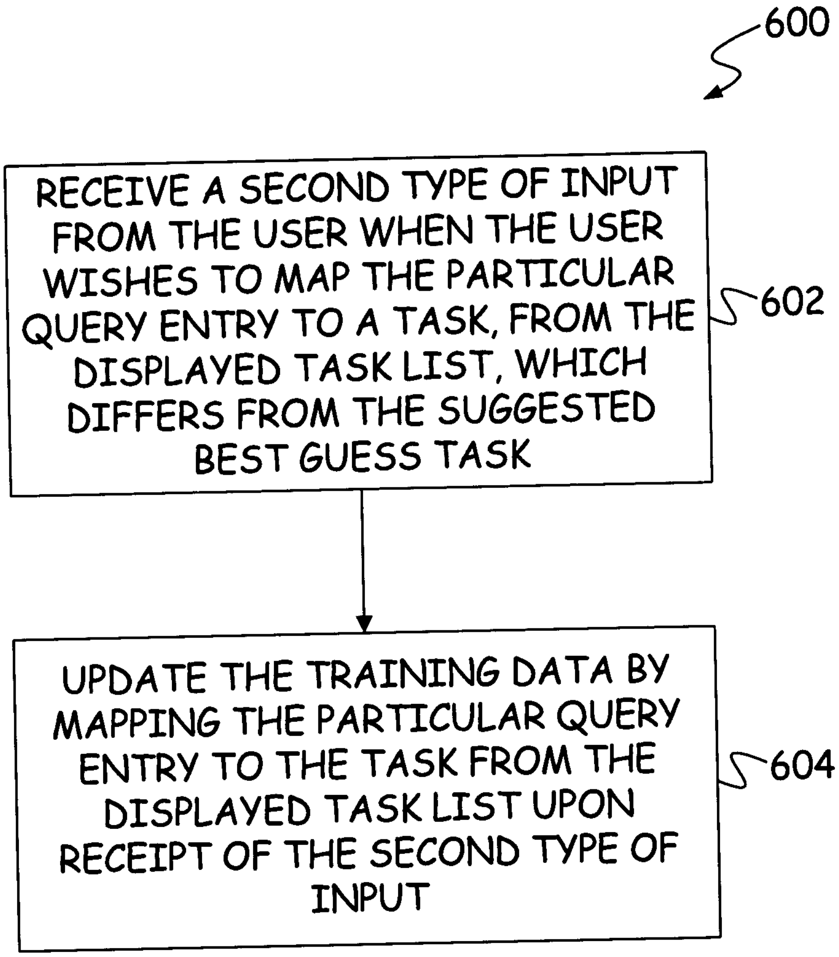

RECEIVE A SECOND TYPE OF INPUT FROM THE USER WHEN THE USER WISHES TO MAP THE PARTICULAR QUERY ENTRY TO A TASK, FROM THE DISPLAYED TASK LIST, WHICH DIFFERS FROM THE SUGGESTED BEST GUESS TASK
UPDATE THE TRAINING DATA BY MAPPING THE PARTICULAR QUERY ENTRY TO THE TASK FROM THE DISPLAYED TASK LIST UPON RECEIPT OF THE SECOND TYPE OF INPUT

FIG. 12

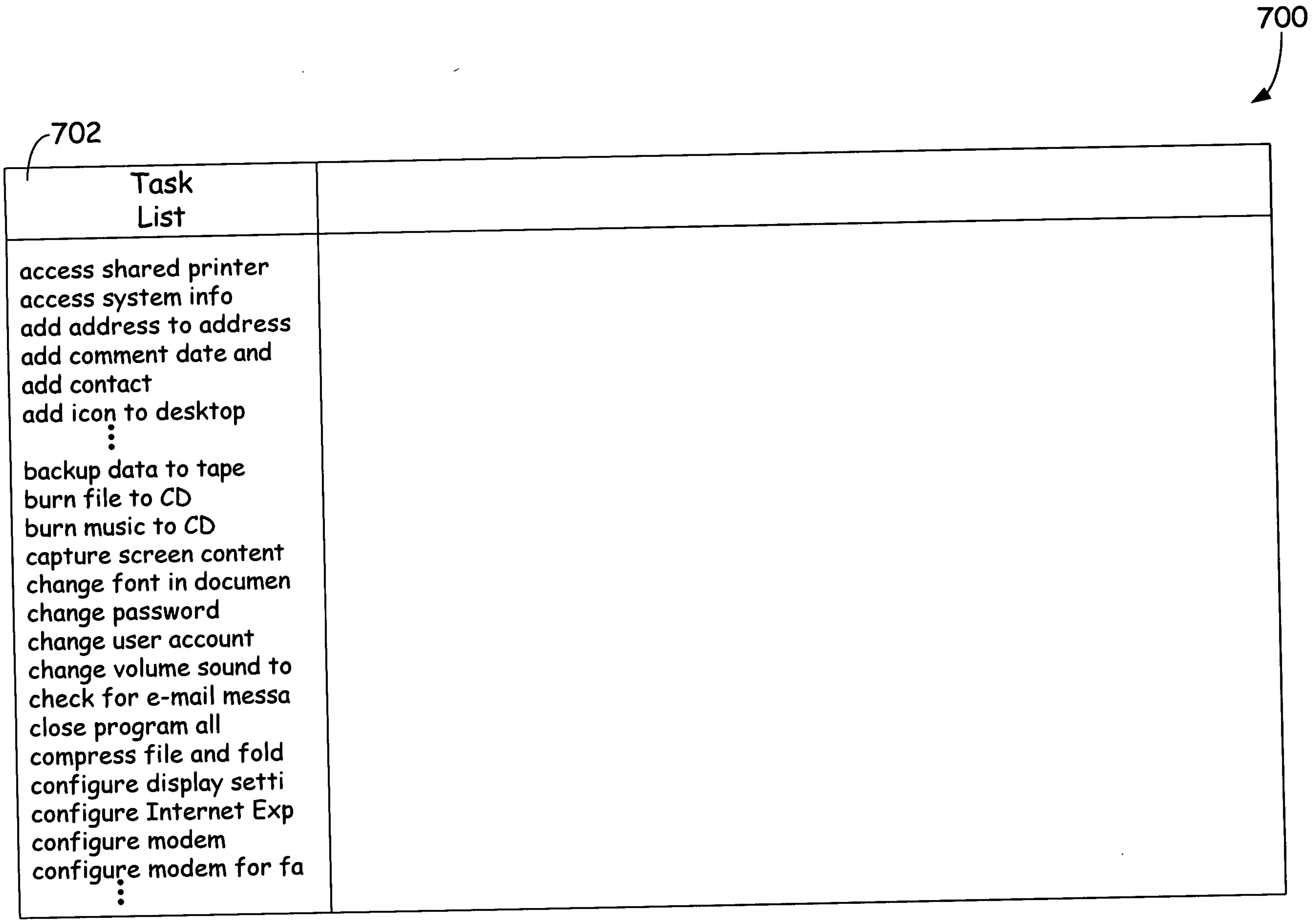
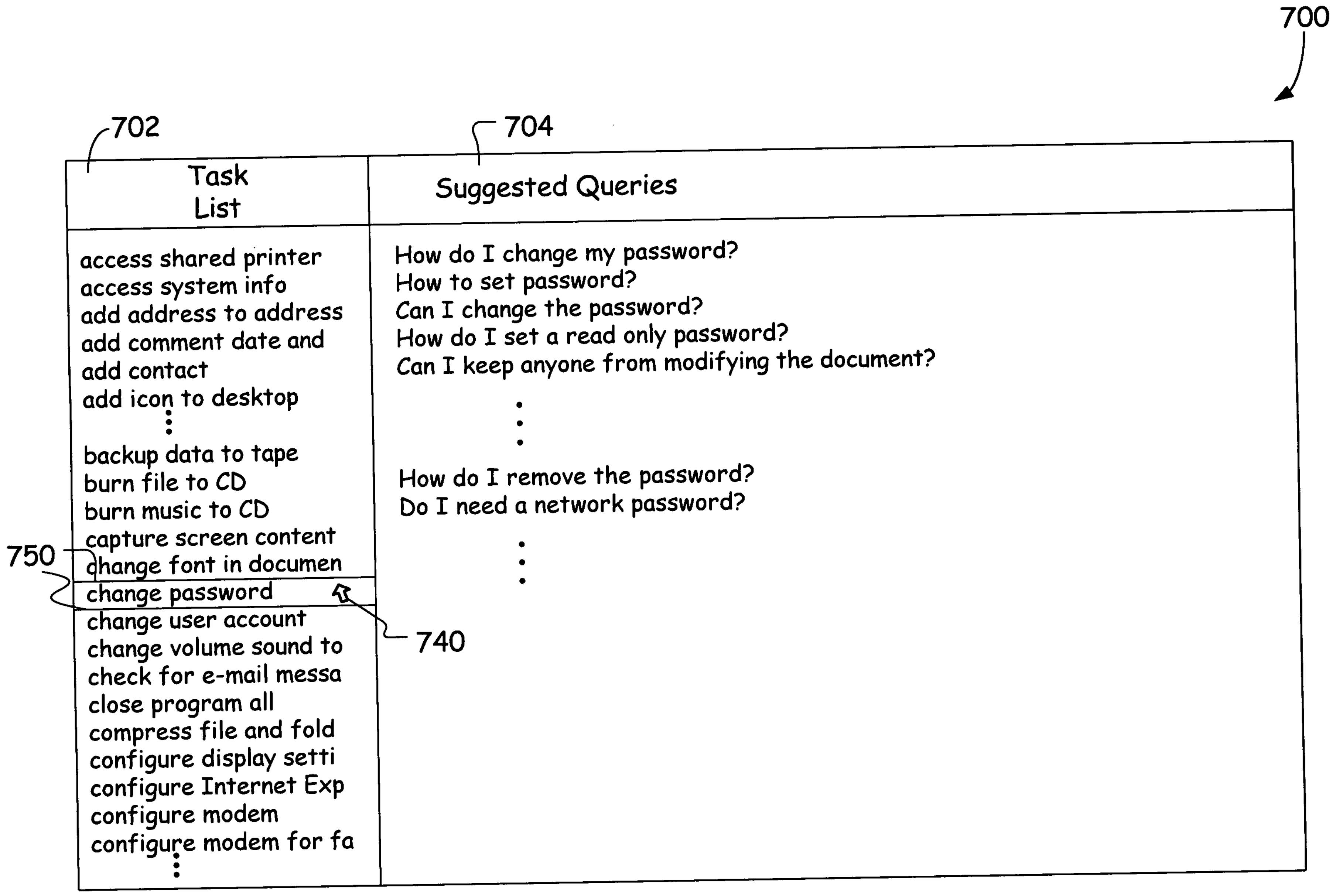

700
702
Task
List
access shared printer
access system info
add address to address
add comment date and
add contact
add icon to desktop
⋮
backup data to tape
burn file to CD
burn music to CD
capture screen content
change font in documen
change password
change user account
change volume sound to
check for e-mail messa
close program all
compress file and fold
configure display setti
configure Internet Exp
configure modem
configure modem for fa
⋮

FIG. 13



Task List

access shared printer
access system info
add address to address
add comment date and
add contact
add icon to desktop
⋮
backup data to tape
burn file to CD
burn music to CD
capture screen content
change font in documen
change password
change user account
change volume sound to
check for e-mail messa
close program all
compress file and fold
configure display setti
configure Internet Exp
configure modem
configure modem for fa
⋮

Suggested Queries

How do I change my password?
How to set password?
Can I change the password?
How do I set a read only password?
Can I keep anyone from modifying the document?
⋮
How do I remove the password?
Do I need a network password?
⋮

FIG. 14

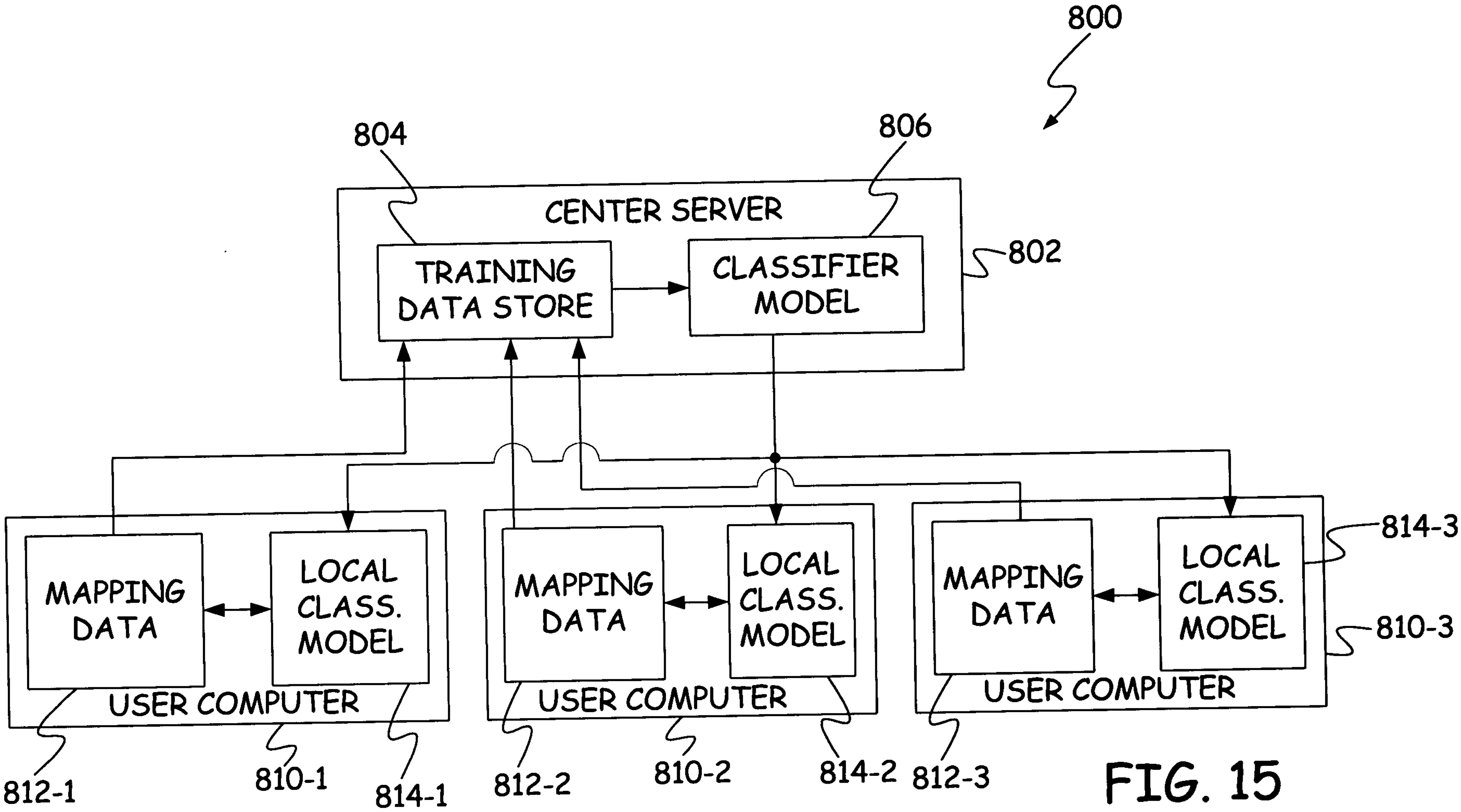

800
804
806
CENTER SERVER
802
TRAINING DATA STORE
CLASSIFIER MODEL
MAPPING DATA
LOCAL CLASS. MODEL
USER COMPUTER
812-1
810-1
814-1
MAPPING DATA
LOCAL CLASS. MODEL
USER COMPUTER
812-2
810-2
814-2
MAPPING DATA
LOCAL CLASS. MODEL
USER COMPUTER
814-3
810-3
812-3

FIG. 15

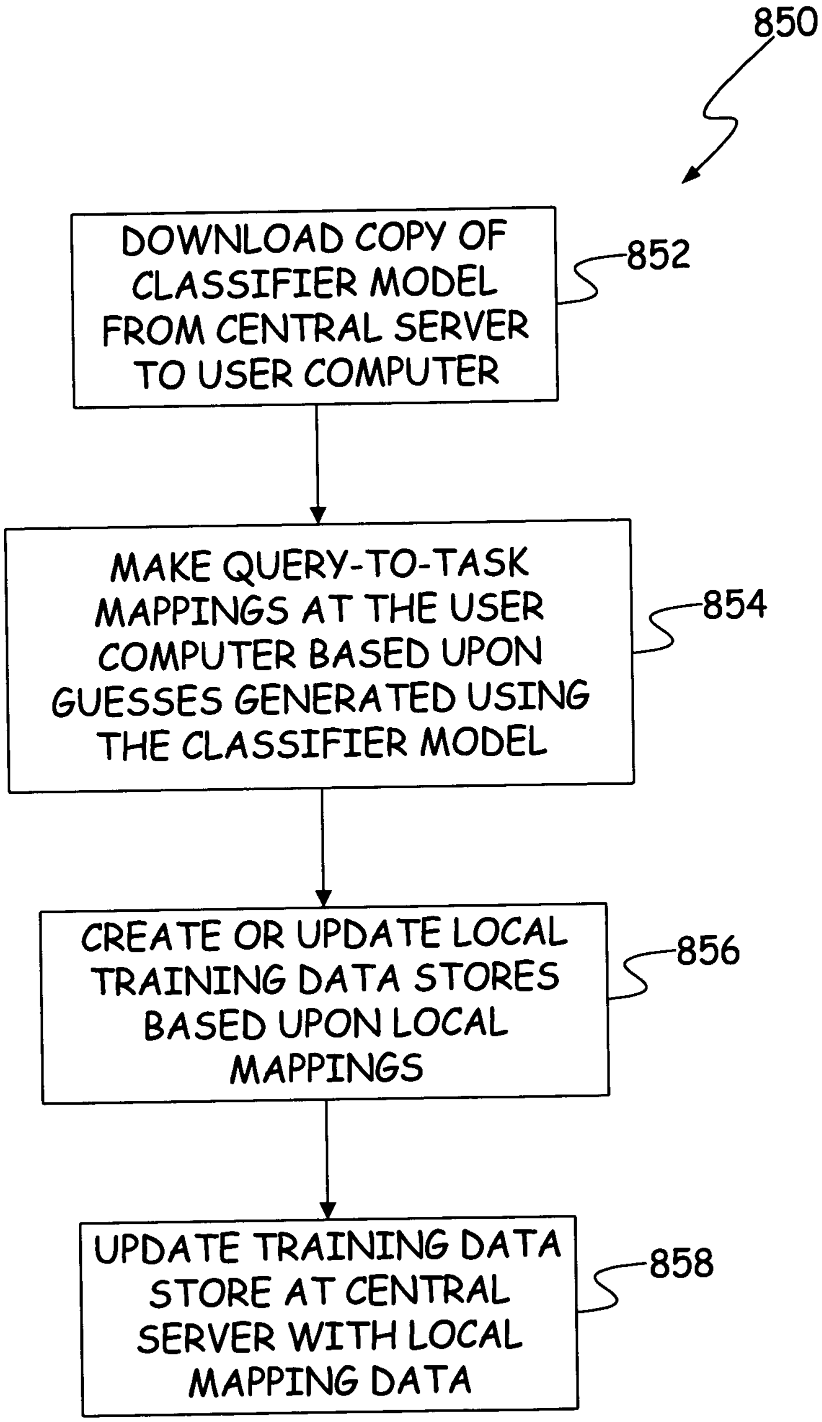

850
DOWNLOAD COPY OF CLASSIFIER MODEL FROM CENTRAL SERVER TO USER COMPUTER
852
MAKE QUERY-TO-TASK MAPPINGS AT THE USER COMPUTER BASED UPON GUESSES GENERATED USING THE CLASSIFIER MODEL
854
CREATE OR UPDATE LOCAL TRAINING DATA STORES BASED UPON LOCAL MAPPINGS
856
UPDATE TRAINING DATA STORE AT CENTRAL SERVER WITH LOCAL MAPPING DATA
858

FIG. 16